

A Monthly Publication

ATARI USER

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April 1987

£1

The
official
magazine for
Atari 8 bit users

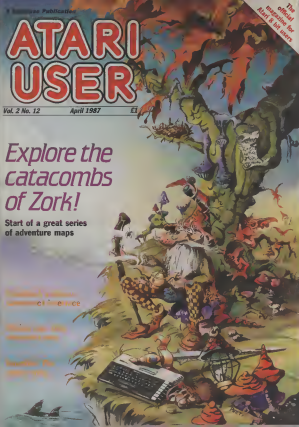
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Interview with
Atari's CEO

Interview with
Atari's CEO



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Marketing Plan
 Financial Plan

Abstract *Journal of Management Education* 32(10):1139-1150

Admission requirements: High school diploma or GED
Transfer credits: 12

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Modularization options: None
Full function: great thing!

1999	1.00
2000	1.00
2001	1.00

After their extensive program today and others for publication. There at 10:30 a.m. based on computer printout and proof sheets double spaced. Margaret Keegan advised the management for camera tapes of the Peter's student program and addressed tonight's address. He suggested that the center for government. Thereafter, a letter was presented by Margaret Keegan. The letter was for the right.

the 1987 Japanese earthquake and the amount of time for investigation is reduced. On the other hand, the use of a portable computer will not guarantee the reliability of the results because the portable computer is easily damaged, damaged by the use of the network, and the data is not stored in a safe place.

[illegible]

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Catch up with the ever-changing world of the 8 bit days

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LifeTime

Stephen Williamson introduces the *Richardson Character Folio*.

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THESE RESULTS ARE IN ACCORD WITH THE FINDINGS OF OTHER STUDIES THAT HAVE SHOWN THAT THE USE OF A SINGLE-STEP PROCESS CAN BE EFFECTIVE IN IMPROVING THE QUALITY OF THE WORK.

Full and part-time writers are urgently needed by Database Publications, publishers of Atom User and its companion, Atom ST User. If YOU know the Atom or Atom ST inside out, can express your ideas on paper - and want to become part of the exciting future that lies ahead for Atom machines, then write now to: The Managing Editor, 66 Chester Road, Hazel Grove, Stockport SK7 5NF. Please include your phone number.

AN Atari 8-bit software revolution has begun, prompted by a bridge-building exercise from the company to developers and the arrival of the video games machine, the 8800.

Atari recently acknowledged its "inadequate support for programmers in the past and vowed to get a sight from now on.

And software houses are responding with more conversions to the 8-bit and a glush of more new games on cassette and cartridge.

Included in this shake-up to give more support to third parties is the appointment of National Headquarters in men-

SOFTWARE SHAKE-UP

Atari promises much more support for programmers

ager of software marketing, he explained. My role is to give help and support for software generally and especially for that about to be launched.

"We need, and are actively looking for, more cartridge-based software for the 8800.

"The response has been excellent. Software houses are really responding. We know there was room for improvement and we feel we are turning the tide.

The company was approaching publishers about cooperative software advertising, naming particular products to particular publishers and everyone he had talked to was willing to help.

Atari told developers that it has set up a team of engi-

ners to test software from developers, and is working to cater for the growing demand for better documentation between Atari and authors.

A bulletin board has been set up to aid this.

Optimistic

Atari technical manager Les Payer said "As far as 8-bit computers and games consoles are concerned, we have revised our sales targets upwards and we are very optimistic about further multiple business.

We hope this will motivate software companies to develop and market new titles for the 8-bit. This situation would be greatly assisted by the existing base of extremely loyal users.

Atari now offers an

expanding market opportunity to all.

Through it is already expressed by the share of the market now being claimed by the 8-bit machines.

It began with a conversion of its hit Jet Set Willy and is continuing to move into the market with two more games.

Wheels Olympics is a multi-level simulation combining five sports, each of which uses 60k of code and Who Dares Wins II is a conversion of the popular combat and strategy game.

Tyranoid's lead of development, Dave Cook said "We feel that considering the price of the 8-bit maps and the share of the market it is now



A CONVERSION of the Star Wars movie series is promised for the Atari 8-bit by the end of the year. In something of a coup, Danvers has secured the European rights to produce some computer versions of Star Wars material plus The Empire Strikes Back and Return of the Jedi.

Atari Inc, holders of the copyright on these games, granted Danvers the rights through their licensing company, the International Development Group.

All the more for us...

A **FREE** award certificate to the first exclusively 8-bit million of Atari User. Mine that our 8800 readers from Atari. We want you to be driving off at our page to join the Atari 8-bit party.

From now on you'll be able to read even more of your favourite articles, tips in more games listings and find out more facts than ever before.

We've been looking carefully through your comments on the magazine to date via the recent Reader Survey, and it is encouraging to see how many of you enjoy our balance of features. We've got lots of exciting plans for the coming months, marking our second birthday in May, but for

now we have no less than three great new features starting this issue. And later we have to offer.

Two of our most popular writers, Len Gilling and Stephen William Lee, present the first installment of their new series - isn't it long now Jet Set Willy or Jet Set Willy your Atari programs, and Steve's advanced character set editor.

We also take you behind the scenes on the development of one of the most sought after arcade emulators of the year - US Gold's Gauntlet, the massive Atari arcade hit of 1985. In addition, Gilling's advertising column has had a complete face lift and boasts a regular monthly adventure map.

All of our regular features are

here as usual of course with not just one but two great games the month.

Len Gilling's Gauntlet column shows you all the most requested tips from the mailing - that of how to download your own printer without to run a Gauntlet printer without spending a small fortune on the extra hardware.

Atari Willy will be continuing to look at the workings of the can that important system, and this month considers how to add your own data hardware.

A final word on contributions if you want to see your own work in Atari User turn to Page 82 for some useful tips on how best to go about it.

Atari 8-bit business booming – Sam Tramiel

A 12,000 that the film is too tough to portray back to life in a very long way that made by copyright (photo). Sam Truitt of the Museum of Modern Art.

He sampled old Atari games (5 in) which games machine the 8800 is being the new flagships of the games machine shop.

We are particularly happy about the initial response and now have the financial muscle to ensure that Atul becomes once again the leader in the 8-bit computer world," he said.

Atam is indeed on the best of financial health. The corporation's latest results show a recordable

Students who are not interested in the mathematics course
should not be enrolled.

The major part of this gain is the last quarter of 1999 when the company broke all records in three days: on Sept. 29, it sold up sales of \$92.847.000 against \$40,280.000 for the same period in 1998.

The year's sales totalled just over \$250 million against almost \$142 million an increase of \$10 per cent. This left the net income for 1986 at about \$23 million.

"We are now in a healthier financial position than Commodore ever was" said Jack Trammell, the man who built Commodore into a billion-dollar

disregarding and thus never
discussing them with us before.

The strong performance in 1998 is the result of a resurgence in demand for value-added systems and a growing concern amongst customers of the value of the rest of our products.

"We are operating from a position of strength now. We are not only virtually debt free, having paid off everybody, but we have \$70 million in the bank," he said.

The introduction of the 3D video game system and other major Atari products would drive the company's growth in 1980, said Frazier.

Travel by rail to London for the Mori Computer Show, then visit the theatre, shop the night at a top hotel — and all for an incredibly low price!

ATARI

COMPUTER

SHOW

London
April 30-76

All-in-one package includes return rail fare from anywhere in Britain, accommodation at a luxury hotel (including private bathroom and full English breakfast) plus a ticket for a top West End show and entrance to the Royal Command Room.

You can choose from: Las Cruces Congressmen at the Ambassador, Rio San Antonio Wine Tasting at the Spanish Garden, Harman or Mund at the Ambassador or Back For Your Wills, at the Embassy. For an exceptional \$4 you can see Old Street at the Theatre Royal, Captains of the Spanish Navy Society at the National Palace or Winemaking, Open at the Embassy.

Software shake-up

Spence, R. 1997. *Spence's Dictionary of Archaisms and Obsolescences*. New York: Dover Publications.

clearing, there is to be a
new one.

"We have therefore decided to support the resolution it means the way to go."

The director for our state government has actually taken up his own case.

and *Mastomys natalensis* that is, extending the range of *R. rattus* southwards.

"The Open games we have published have done very well," said a spokesman. "We feel happy continuing to support the i-Net especially with the arrival of the GSN."

Fat Station of Minneapolis, which has published a card version for the list, said that her company was talking to Atari about more games. The situation is under consideration.¹⁴

Each Member Drove His
big steel conveyance for the
\$100 head sold well. His feed
store is a good market in
Western for \$100 gamins - and
this can find into the week
market, he said.

Publishing drive

ATAI plans to get back into software publishing in a big way. The company believes that British software is equally as good as software which can be produced in the US.

—We are looking for British programs which are new, market around the world," a spokesman said. Star Trek with its dignified visual and impressive graphics was cited as a perfect example of homegrown programming.

And is also looking to market British written business software.

Multiples move Atari's way

STAND by for an Atari marketplace in the High Street this year. The company is at an advanced stage of discussions with several leading chain stores pending its E1 and E2 machines on their shelves.

Among the multiple Aars has targeted are W H Seeds, Deere & Co, LeMay Co and Woodward.

There are plans to test market the S7 range at three of them in May and this will be followed by the game machines – the new S&B 2600CS and even popular 12026 – in September.

Allen spokesman Peter Waller said the company is delighted it can place its machines in the bag for machines, some of which handled its early film models.

Negotiations are nearing completion, but we don't want to jump the gun by announcing deals before they are fully signed, sealed and delivered," he told *DealBook*.

"The people we are dealing with are well aware that the IT range is a huge seller and that our 30-in machines have no competition where soft ware availability is concerned."

Item	Actual	Budget
A	1000	1000
B	1000	1000
C	1000	1000
D	1000	1000
E	1000	1000
F	1000	1000
G	1000	1000

1. 100% 2. 100% 3. 100%

- [illegible]

[illegible]

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1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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On display for the first time in the UK will be new Atari products that are set to rock the home world.

Star of the show will be Atari's 384 PC compatible, offering a radically new design at a price that will shake loose the PC marketplace. There too, will be the latest models in the ST range - the Mega ST workstations and the remarkable Atari laser printer. The machine that has broken the sales barrier in desktop publishing. All these along with breakthroughs for the ever-popular 8 bit range and hundreds of new software packages will be on display at the April Atari Computer Show.

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1987 UK Atari Computer Show Tickets, Complete Details,
in Computer World, Future Users, March/April 1987 p.47

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Show features games arcade

A VHS of running through over Atari's plans for a play it yourself games arcade at the coming Atari Computer Show.

More than 30 machines running the latest 8-bit software will be available in the arcade, but the company is removing tight-lipped as to which games visitors will be able to play.

We'd like to keep the details under wraps until the last minute, said a spokesman.

Chosen as the UK launch pad for the company's new IBM PC compatible and Mega ST workstations the three-day show opens at London's Royal in Hammersmith on April 28.

More than 70 exhibitors will be attending the exhibition and many will be unveiling new releases.

Three new games will be available from Red Box Software - *Assault on Dark Forces* and *Forbidden Island* - all costing £7.95 on tape, £9.95 on disc.

Tynesoft will be offering a range of budget titles on its new Micro Value label, all priced at less than a pound.

The Atari Computer Show

also plays at the Royal, Hammersmith, London from April 29 to 30.

Shows open at 10am each day and close at 6pm on Friday and Saturday, 4pm on Sunday.

A money-saving advance ticket order form can be found on page 7.



Atari games machines are on

Hard disc men fly in

AMERICA's leading supplier of hard disc drives for Atari machines is to jet over to London to exhibit at the April show.

The Supra Corporation is to show a stand with its UK distributor, Premier Software of Harrogate, North Yorkshire.

It will mean that Atari users will get their first opportunity to see Supra's revolutionary 20MB 8-bit hard disc.

Equipped with MyDos disk operating system,

rebars, power supply and interface unit, the drive plugs into the parallel bus at the rear of the 800XL and the 130XE.

Though priced at £269.95, the drive is likely to be much sought after by software writers and developers anxious to capitalise on the boom in the Atari 8-bit market.

Supra is well established in the United States, with its drives currently outselling their counterparts from Atari by a ratio of

three to one.

All the drives supplied by Premier will come with boot and utility programs and carry a 12-month guarantee.

"The Supra range of hard discs bring previously unheard of speed and capacity to the Atari market," says Dave Fields, Premier's sales manager.

"We are excited about bringing them into the country where we're sure they'll prove as popular as they are in the States."

Prestel via MicroLink

ATARI gaming enthusiasts may soon be able to access Prestel's massive 300,000 page database through MicroLink.

British Telecom is marketing the telephony services of Prestel and Telecom Gold, with which MicroLink is associated. This will immediately create a 120,000 strong user base of micro owners able to exchange mass egs with each other.



Repair service launched

A repair service for owners of 8-bit Atari machines has been launched by Haverhill-based company Machines.

Offering a professional service and using the latest diagnostic and test equipment available, the company

has already attracted custom all worldwide.

Says managing director Ian Culverell: "We consider our company to be an extension of the good name of Atari and as such we offer the quality of service they would expect."

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Announcing the all new **ULTIMATE** drive enhancement
The Drive enhancement consists of a plug-in PCB
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one time it takes a standard 1050 drive to
READ/WRITE a single sector (Up to FIVE times
standard speed)
- supports double, Dual and Single Density
- Sector Rotate is now no longer required to
obtain Hi-speed as with old Doubler
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write, Fast read, Drive with/lock, Sleep on/off, Fast
formatting
- Fast write with verify. This system is faster than
other systems which write without verify
- A double sided operating system disk is
supplied which offers the following:
 - 8 Doubler, 14 Doubler, Standard 1050 and
 Archiver emulation
 - Triple Tracker, Diagnostic tester, A/E and 1050
 Disk Backup utility
- The PLATE can be made invisible to software
detection by either Slow down or 1050 emulation
- Supplied with detailed information regarding
software drive control to allow you to access the
full potential of the PLATE
- Will run all available disk operating systems
(DOS) including: Spectralis, Happy wrap speed
Disk and other H504 speed systems
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software updates etc for the price of Disk and
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TORPEDO!

By GARY TINSLEY

Abstract The purpose of this study was to determine if there were differences in the prevalence of risk factors associated with the development of periodontitis between patients who had been treated by a general dentist or a periodontist. A total of 60 patients were recruited from two dental practices. All patients underwent a clinical examination and a series of blood tests. The results showed that patients treated by a periodontist had significantly higher levels of periodontal disease than those treated by a general dentist.

"OMG, Barbie stations!" Forgado says.
And forgoes the personae.

Every ship has finally reached our territorial waters, and your mission is to sink as many as possible. You are armed with a large number of deadly high explosive torpedoes but your mission is limited by the length of time your air supply will last, your star submersant.

Can you score enough points to enable you to be awarded the rank of Admiral—or will you be thrown out of the race?

Type in the listing, and check it out with our Good & Beautiful character cards. When you're happy with it, SAVE a copy and then type NAME to start the name.

Press **Enter** to move your joystick to change between the three difficulty levels. The number on the left will show the level number selected. Press **START** or the joystick fire button to begin the race.

During the game you can press Start to quit, Options to pause and



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An extra 40 points are added if a forest is destroyed in forest conditions.

The "Air low" warning will sound to tell you when the game is nearly over, so let as many beats as you need!

WATER **PROCESSES** **2000**

Flowchart of a function	25 points
Report card grade	10 points
Multiple choice questions	10 points

PROGRAMA DE AVALIAÇÃO

- | | |
|---------------|---|
| Lines 40-70E | Set up player variable <code>GRAPEX</code> , create the food shapes above sound registers, change with <code>GRAPEX</code> 0 line to make <code>OLD AMTIC</code> 3+100 for <code>GRAPE</code> . The <code>OLD</code> variable and its colour are <code>MOVED</code> into <code>Page 8</code> . This colour first appeared in <code>Arctic magazine</code> and it makes sense to turn back of <code>AMTIC</code> 3 made (caption of) to be a different colour and the text a different font. |
| Lines 300-317 | Print last screen, check for <code>GRAPE</code> is first letter to be pressed – also check for <code>GRAPE</code> , movement on <code>GRAPE</code> to be pressed for level change. |
| Lines 330-339 | Set an <code>orientation</code> rate <code>OLD</code> reset, <code>GRAPE</code> and <code>GRAPE</code> for <code>GRAPE</code> variable <code>OLD</code> <code>GRAPE</code> shows <code>GRAPE</code> level positions, into numbers of <code>GRAPE</code> level. |
| Lines 340-380 | Draw the game screen. |
| Lines 380-410 | Make game loop – adjust an <code>level</code> (1), check for <code>GRAPE</code> movement on |

move alternately, right foot and back position. If boats move off center then reset, shoot for the bullseye and if no low torpedo if BL reaches FWD then drive bow forward and set top flag

Test for a hot — shock player collector's registers (PPHC 60250 — 60294) and any of these receive 4 thru a torpedo has for a boat. Add to games; set he second set again; set boats for 1871; set 1881 1882 1883. Each column and make magazine runs.

From routine Bash CASH Field
point to STATUS check for Select to
be pressed (for return) then loop
back to line 30

End of game: Green scores, double
Bills (double), post score post
number of points left and individual
points but points are not made score

Open rooms, built to full screen for low lighting. Free air flow and windows with light.

OVER the next three months we'll be explaining how to make your Basic and machine code programs load and run automatically, just like commercial machine code software. We'll start by examining cassette systems, then move on to the various disc techniques.

The most obvious reason for using autoboot files is economic — programs look more professional if they load and run automatically — but they have many other advantages which are less apparent.

You can change the screen colour after the margins, set some Teletypes select lower case letters or insert a flashing cursor, all before the READY prompt appears.

You can load new character sets, ready drawn screen images, or other large blocks of data before Basic takes control. And the autoboot system is the only way of changing MEMLO which tells Basic where to find its lowest available memory.

Remember that points to a higher value will load an item in the low end of ram which Basic can't touch and which will be in the same place regardless of the host computer's memory size.

The bad news is that autoboot files must be written in machine code. The entire load and run process happens before Basic gets control, so there's no direct way of autobooting a Basic program. However, it is possible to create a machine code file which contains Basic then calls and runs a Basic program, and the end result is hard to distinguish from a single-stage autoboot operation. We will be giving you several suitable programs as we go along.

The external way of explaining how an autoboot file works is to consider one. Program 1 contains the simplest we can think of — it just changed the screen colour to the value in the last row and resets MEMLO to protect itself from Basic.

You will need some kind of

Just like the real thing

LEN GOLDING shows you how to give your programs that professional touch

START OF A NEW SERIES

assembler, such as the Atari Assembler/Editor cartridge, to make it work in this form, of course. Although it's short, it embodies all the features of a cassette autoboot file, so if you can make this work then there's nothing to stop you writing much more interesting routines.

Let's look at the former step by step. The first six bytes (hex 80 to 110) are a header containing information which the operating system needs to carry out the autoboot process.

The first byte is always one, though it isn't used by the OS. The second is the file length in blocks of 128 bytes, rounded up if necessary.

Next comes a two byte address which tells the OS where it can find its item loading the file.

Finally the last two bytes hold the installation address. Control will pass to this address during power up, and whenever System Reset is pressed. The rest of the file, from COLDIST to ENDIST, contains all the machine code instructions which we want carried out before Basic gets control.

Here's how the cassette autoboot system works. When you switch the power on with the Start key held down a single beep tells you to Press Play on your cassette recorder, then

hit any key. The computer begins by reading the first 128 byte record from tape into the cassette buffer starting at 16251 (207D).

It extracts the information from the first six bytes, starts the load address at 8007AD (50420), starts the installation address at 0A501 (2D81) and makes a note that it's using a cassette-based program by storing 2 in the 8007F flag (address 8).

It then copies the entire first record (including the header) from the cassette buffer to the load address and works out how many more blocks are needed (then loads them directly from tape to the load area).

When loading is complete, the OS performs a sequence of jumps to run our subroutines. First it does a JSR to 8007AD — it's straight after the header because it's a JSR, not a JMP — this section of code must end with an RTS instruction (line 170).

When it returns via the RTS state-mend the OS checks the 8007 carry flag. If it's set, the autoboot process terminates with an error message, but if it's clear the process can go on to stage two.

The first section must always switch off the cassette motor, clear the carry flag (with a CLC command) and

20	80000001 = 1 (FIRST CASSETTE RECORD) 128	8000	8007AD	
21	00000000	8000	00	
22	0A500001	8000	00	header address
23	00000001	8000	00	
24	00000000	8000	00	
25	00000000	8000	00	
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return via an RTS.

The second jump is another JSR this time to the initialization routine, copied from the header and now held in CASH2. In Program 1, initialization starts at INIT, and that is where we change the screen border colour starting with the instruction LDA #148.

Any code between the initialization address and an RTS instruction will be executed not only during power up but also whenever System Reset is pressed.

If you want to alter any system parameters, such as MEMLOC, you must do it here, otherwise pressing Reset will wipe out all your new values. This "initialization" section must always end with an RTS instruction.

The final stage of the boot load depends on whether or not a cartridge is waiting to take control. If so, the OS simply does a JMP to the cartridge start address, usually 48000 (16A000). With BASIC installed this produces the familiar READP message.

If no cartridge is present, or if it's a special type that doesn't want to run, the OS will do a JMP to the address contained in a pointer called QOSWVC.

#1011 (1A4F)

During power up the OS instructs to point to the "backdoor" routine - memory pool made on 480000 computers or self test made on XL/XL models.

If your autoboot file is a self-contained machine code game, or other program which doesn't need support from a language cartridge you should change QOSWVC to point to the start of your main code. This may be accomplished during either the stage one or stage two machine code sequence.

One way of doing this would be to add the following lines before the final RTS in Program 1:

```
LDA #MAINCODE+0
STA QOSWVC
LDA #MAINCODE+058
STA QOSWVC+1
```

Insert your main program between the final RTS and the label FINISH, and begin it with the label MAINCODE. So long as no cartridge is installed, and external Basic is switched off the final JMP will now point control to your machine code program instead of to the backdoor routine.

The OS will repeat stage two and three whenever System Reset is pressed, which means that you could write an entirely new main routine and the user would never even know about it. We'll show you how to take advantage of this later on.

Now that we know what an autoboot file looks like and how it works, we still have to get it onto tape somehow. This isn't as simple as it sounds, because autoboot files must be saved in binary form, with short inter-record gaps.

No instruction in the repertoire of Basic on the Assembly/Editor cartridge will produce the correct format automatically, so we need a special routine to do it for us.

Program 11 is the one to use if you're working in assembly language. The code up to line 600 is the raw data routine. It calls ORD directly to write all the data from HEADER to FINISH directly on to tape. It is important to keep this code separate from the data you want written to tape, so we've put it out of the way in page 11.

The rest of Program 11 is a duplicate

```

10 'PROGRAM 11 - PROGRAM 1 WITH AN OPTIONAL, EXTEND THE CODE TO QOSWVC
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Autoboot

of Program 1. When you have typed everything in, assemble it then with `DEB4C` mode and type `G` to GO to run the machine code at address `[MOO]`. Set the tape to record and press the `Run` key and the data will be written to the tape in the correct output format.

If you can't have an assembler, Pre-processor II will do virtually the same thing. As the DATA statements contain machine code they must be absolutely correct or your computer will probably lock up — so make sure you save a copy before you try running the program.

Type **Run** to run things off then follow the same procedure. Only the cycle of lines 140 and 150 will be sent into the cassette file. We'll be using this program again real soon, so learn a new song.

To load the resulting file, switch off the computer, remove the tape and switch on again, holding down START (but not **Open**). Press Play when the beep sounds and hit any key. After the usual leader delay, you'll hear the music of the file being loaded, then it'll

[illegible]

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As well the screen colour will change before REACT is printed.

As an experiment, try changing the `border-color` back to its default value by F00F F13 0. Now press System Reset, and you'll see the new colour is restored on the C65 performs as J88 (Source: F05000).

■ **What research will be explaining the way to make your own basic programs into sophisticated personal files.**

[illegible]

RICK HANSON

FOR THE ATARI XL/XE WITH DISC DRIVE.

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Fuzzy problems

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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THE Concept of the Integral
cycle Day is rather less than
pleased with you. Crucible.
It seems that you were in
charge of clearing the side
lane right - and you didn't
get the turn back on the
Curry cages properly.

During the night they all escaped into the depths of the Midwest and you are going to have to track down and capture them.

To help you get around you'll have a jet pack – just press the physical button to flip that's all you'll need. Oh and a speedy board and a megapack of waterstones – these Powers can get into some pretty twisted situations.

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business, it's important to find out what the market is doing, in terms of the size of the market, what the competition is doing, and what the opportunities are. It's also important to find out what the risks are, and what the potential return is. This is why it's so important to do a market research before you start a business.

You'll be able to see through the beard if a rage haze takes hold of the predators you've caught. So even you need to keep count.

You can always tell a fake by its mere grin and slanting shoulders rather like a cleft between Dick Dastardly's Muttley and Edward Heath. They aren't actually evil, but they are rather cheap and cunning so watch your step.

Mooring your Cruise Time Lighting starts sparkling all over the place if you loiter for too long so don't get waylaid by some of the rather pretty lo-

If you find you're getting tired, just look for the Energy Packs. One rather important tip: don't touch the walls or ceiling. They're



you passed it and I didn't pass it as a result, I'll never be your enemy or your friend, and that's all.

On contrary you are also know I said the P signs were meant to, "misleading" Well there are some where I use with really beautiful - ground glass - goblets - and several and such like thing your eyes peered and they try catching any one the P signs will use?

Right: What a Difference 100% is played for. With a 100% win bonus for a good 100% win, it's worth the wait. The new 100% win bonus is 100% of the total bet, plus a 100% of the total bet, plus a 100% of the total bet.

Large sampling error
due to small number of
strawberries in the
Michigan harvest plot.
Small sample size - 1
strawberry per plot
leads to large sampling
error.

Myra has three more eggs in the nest, and, during the last few days, has been sitting on the nest, looking out at the lake, looking at the water, and at the birds, and at the clouds.

Figure 6

Revenue	2
Depreciation	2
Provisions	2
Value for ordinary	2
Overall	2

Platform for two

Program: **Black Women**
 Pages: **2788** (includes) **28** to
 2888
 Supplier: **Ref: 201115**
 Author: **Black Women**
 Ann: **2003**
 Tel: **0202 2000 1000**

Add an introduction to Robert Kragitz: your ass given a literary lesson to explain the task ahead – quite good evidence to make too.

The value of the price is close to zero in a system and many living future would be constructed but not place the capital character. He said, however, that, unless we are able to keep the price in place, that of several living future is too high and we must be able to keep it low.

Feeling better and bolder that his purchase for future disease and poverty wasn't appreciated in full, we could be inclined to re-

back to a time when there
equal men were a bit of
like.

That was not Maggie's Britain in the late 20th century but Europe in the 1930s.

Feeling as isolated as he is, he has a laboratory in which to perfect the airplane being so critical to an unassuming Future world.

But for the most part, with only limited success, and with a few reports that the Soviet rejection of the official directorate of all but the most hardy of double-glazing salesmen, it is your task to find Otto and destroy him before the perfect free fall.

You roam freely in the chateau and reach battle through various dungeons and dungeons past the physical realm and then



doi:10.1017/S0022292412001717
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 Printed in the United Kingdom

Through multi-touch gestures, the game character's actions are controlled by sliding gestures. Interestingly, it's possible to spend a whole lot of time in the game with the joystick, but the game would never become boring. When a joystick was being used as a directional pad, it's impossible.

Followers brought their own food to a picnic played golf. In a few players' parties, food, including several courses, and some more pleasure through the

As a result, the "new" law is a political statement that the United States is serious about ending the global pharmaceutical cartel and making pharmaceuticals more affordable for all people. It is a bold step toward ending the global pharmaceutical cartel and making pharmaceuticals more affordable for all people.

Product **Product**

Journal	1
Graphical	1
Playability	1
Value for money	1
Overall	1

Real high flyer

Program: Tomahawk
Price: £5.95 (incl. VAT)
From: Digital Integration
Supplier: Digital Integration
 Whitehouse Trade Centre
 Whitehouse Road
 Camberley, Surrey GU24 3AJ
Tel: 0714 624444

FLIGHT simulation for home computers – just one of the things with the real thing, but they like give you some of the flavour and Tora hawk keeps at that.

In fact I am constantly amazed at just how much can be crammed into a £5.95 bit computer – regardless of make.

On the Atari Tomahawk scores very highly. I have read how Tomahawk is pretty and unresponsive on other machines but I found no such problems with this version.

Tomahawk's presentation immediately reminded me of Digital Integration's other flight simulator, Fighter Pilot Heaven, while that is clearly an excellent-looking simulation by the F16 Eagle, Tomahawk is a simulation of the Agusta-Bell AH-64 Apache Advanced Attack Helicopter.

As such, it includes both air to air and ground attack combat simulations.

Although there are no music sound effects, adding the feeling of realism without being too harsh. They include the launching of missiles and gunfire, explosions, engine and rotor sounds.

The rotor sounds really stand out when the chopper is at rest, after turning off the engines.

You control the machine using a combination of joystick and keyboard input – an optional second joystick doubling as the rotor and collective levers.

Flying is so simple, it is really straightforward. Pushing forward on the stick both increases speed and reduces the attitude degree,

drag on how much angle of attack you have set on the rotors, with the collective lever.

You pull back the stick to gain height and reduce speed, and the automatic stabilisers return you to level flight.

Landing is achieved by reducing lift and pulling back on the stick. You can land with up to 50 knots of forward speed and at -10% G – slowing in for a landing, sailing on one of the helipads is demanding, but very slow time.

You can land anywhere, but she will only be refuelled, rearmmed and repaired at a friendly helipad.

You are equipped with eight built-in missiles, 36 2.75in missiles and a 30mm chain gun with 1,200 rounds.

Weapons are aimed and controlled via TADS (the Target Acquisition and Designation System). The chain gun can track but on enemy helicopters but won't even aim at tanks.

There are three combat missions, one for training, in which the enemy forces don't require too.

Mission two involves clearing out four sectors of allied territory of hostile forces. While in mission

three you must shoot the attacking enemy forces, and in the fourth you help defend a base, push back the enemy front line.

You are also provided with a map similar to the one used in Fighter Pilot but, except for a rough terrain advantage, it is absolutely square, without strange colour encoding for land diagnosis.

Booming and heli-heli, it is also shown, but I have not to help you find them without the map, if necessary.

The cockpit display, a fairly comprehensive with a monitor to display targets identified by the TADS computer, which also can be used to help you distinguish between allied and enemy forces.

The normal digital radio means are all there including outside sounds and sets of climb indicators. There are also meters for power consumption, rotor

angle and retarding fuel.

These all take up the lower part of the screen, the map will bring a preview with the top portion.

Colour is generally used to help, with advantage, although rather lacking in scope, predominantly. All the ground is green, for example, and I think a little shading would not have been a bad idea.

However, Digital has crammed a lot of features into the simulation. Having taken the RAF's Jaguar simulator which was three times the size of the map and a very expensive thing, it seems to have achieved a remarkably stable on-screen, I am not sure if the limitations imposed by a £5.95 home micro.

My only negative comment is that ground features – mountains, buildings and targets – are all line drawings. These are flat to look at, but don't give a very good illusion of height – steep are seen on the silhouette at all times.

Overall, this is one of the best programs I've seen as a long time – it is well worth checking out.

Enough basic flying instructions are included to get you off the ground, and particular stress on a point in the use of the collective lever.

Tomahawk is thoroughly recommended for would-be helicopter pilots.

Rob Anthony



Sound	4
Graphics	4
Playability	5
Value for money	5
Overall	4

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20 runner up prizes: A copy of Silent Service + plus a T-shirt

50 further prizes: A Silent Service T-shirt

The world's leading simulation software company, MicroProse, is offering readers of Atari User more than £500 worth of prizes in this easy-to-enter competition.

On offer are all of their top selling titles for the 8 bit, and prizes centered around the smash hit submarine simulation Silent Service including T-shirts and framed posters which have been specially flown in from the US for the competition.

Other software prizes include *The 10th Kingdom* - a jet fighter simulation and *Decision on the Desert*, a strategic game which allows you to recreate the battle between Napoleon and Montgomery.

How to enter

All you have to do is make an entry word as you see it, four letters or more out of MICROPROSE. No puns, no foreign words and no initials, if please - all words must be in the Oxford English Dictionary.

Then make up a short entry story, why you enjoy MicroProse simulation, in no more than 25 words.

Send to: MicroProse Competition, Atari User, Games House, 60 Chester Road, West Grove, Stockport SK7 5AY

All entries must be in by April 30

Entry Form

Name _____

Address _____

Age _____

Number of words found
(Please list on separate sheet)

"I enjoy MicroProse simulations because . . ."

(Please use a separate sheet - no more than 25 words!)

Some T-shirts are: small medium large
Preferred format for prize: cassette disc



GAUNTLET

ANDRÉ WILLEY meets the
US Gold programming team

IF you had asked any dedicated game player last year what the arcade smash hit of 1985 was, you would more than likely have been given the answer: Gauntlet.

As far removed as imaginable from the straightforward run-and-gun genre which seems to dominate the arcade, this unlikely success was a multi-player graphic strategy effort based on the dungeons and dragons theme.

As long last, this amazing game has been converted for home computers and the Atari 8-bit version was in the final stages of development when I went along to U.S. Gold's Birmingham headquarters to meet the programming team who have had number one chart hits with every new release they've completed.

First of all I wanted to see what all the fuss had been about so Kevin

Bulmer, graphic designer of the team, took me down to the warehouse to see the original Atari arcade machine in action.

I'd often seen crowds of people had died over these strangely designed machines, but I'd never quite had the nerve to try and play one on my own — it all looked so complex.

However, I quickly found myself getting the hang of it and in half an hour I was blessing the fact that the cabinet was deactivated.

Gauntlet has four main characters — the heroes — for you to choose from, each with their own special powers and abilities.

There's Thor, the Warrior, very strong, but with no magic powers to speak of, and Tanya the Valkyrie, not so good in combat but with some ability in magic.

If you want real spell casting power, you should select Merlin the Wizard, but don't get him into hand-to-hand combat with one of the nasties. The same applies to Quenser the Elf, but what he lacks in magic he gains in weaponry.

The characters must find their way

around a series of ever-changing dungeons in which live hordes of deadly ghosts, demons, goblins and other adversaries. They may be shot at, fought, lured to hand or killed with magic spells which you collect as you travel.

Also in the dungeons you have to get through locked doors, food and drink to increase your health rating, traps, use to boost your score and ghost generators which regularly create more nasties if you don't blow them up in time.

There's many other things to collect or destroy, but I'll leave you to find out about them for yourselves.

Often you will need more than one player to complete a level, sometimes fully, with perhaps Merlin casting a spell to clear the way for the others to get through a door. He is the only one who can make full use of the magic potions you see, but he is very vulnerable to attack.

Any player may die at any time by dropping a level down into the slot — there isn't any obvious start and finish to the game. The early stages are certainly easier, but as your skill develops, you will find yourself moving into higher and higher levels.

Technically the game is fantastic, with stereo sound and speech and some amazing graphic action controlled by a 68000 processor with 4MB of ram.

It has two main graphics chips at its disposal — with one taken by the unlikely name of Blagoslav, responsible for generating the 24 bit 24 point sprite in up to 16 colours from a palette of 4096.

The sound effects are generated by a chip with which most of you will be familiar as it is a strong made your faithful friend Asen.

Gauntlet actually uses a standard Policy chip to generate its amazing sound with a separate 6500 keeping track of what it did, the dedicated speech chips sit up to. The whole thing is then separated out into stores — but don't ask me how they reorganise it.

The Atari conversion goes \$19.95 for 1Meg, because the whole Gauntlet program was based on an old 8 bit



The title for a really long time... by U.S. Gold

Atari AFX title called *Qwerty Dungeons*, written by John Polevitch, the man responsible for *Dark Blue C* among other things.

Having seen the inside workings of all its glory we went back to meet the rest of the team. I've already interviewed Kevin Palmer, the artist of the group, who designed the title graphics, character costumes and so on.

Tony Porter developed many of the utility programs used for all versions of the game, and also wrote the Spectrum, Amstrad and MSX versions.

Bill Allen was responsible for the sound and music on all the computer ones, and he developed special routines to allow programming to be carried out on a virtual TOS (Pete's multi-user system) and then downloaded to each machine in turn.

The final member of the team is Bob Arnold, who was in charge of the Commodore and Atari 8-bit versions.

Bob was also responsible for developing a special machine code monitor program for the Atari to allow the Pseudo to transfer its data via the external parallel port – considerably faster than a disk drive would. An entire 256 block of program data could be transferred in about 10 seconds.

Logically enough then, it was Bob who looked through some of the differences between the arcade and home versions of *Qwerty*.

The first obvious and necessary alteration is the fact that only two characters can function at a time, as opposed to the original arcade machine's four controller system.

The only home computer capable of working with four controllers is the Atari 400/500C, but it wasn't considered viable to make a special four-player version considering the limited number of these still in circulation – not to mention the lack of any huge processor time and memory – Qwerty still needs a minimum of 64k to run.

You can in fact play a completely solo game, but there's almost no way to get through some of the higher levels without a friend's help.

You can choose your characters at the start of the game, or the second player can assist at any other time and the computer will randomly select a persona.

The Atari version looks set somewhat in terms of colour range and it really shows the lack of a 16 colour high resolution screen on the 8-bit machine.

The team opted for maximum detail rather than colour – the result is a four colour playfield that said there is so much going on that you don't really

need the 16-colour screen, but also designed for maximum colour depth to appear on most systems.



have tried to mimic arcade graphics or colour, as you can be affected by up to 152 pixels at once.

Much of the development work for all the home versions was completed as early as 1985, including the character sprite sprites and tile patterns.

These were then transferred to the Pseudo development system for later downloading into the other machines. On the other hand, the game graphics, maps and sound effects were developed on an Amstrad and downloaded in the opposite direction.

The arcade game had some 135 dungeons to explore, but you have 512 to work your way through locked at random after the first seven standard screens.

This means that no two games are ever likely to be the same, and even if you do somehow manage to get through them all, US Gold will soon be releasing a disc and tape



version. The end to the deeper graphics, 64k or 128k, the color-depth which will allow 16 colors to your hardware.

containing another 512 rooms.

Some of these contributed that larger level base designed by the main programming team, but others have been sent in by players of some of the other home computer versions following the guidelines given with the package.

This kind of interaction with the players is typical of the game, and something which the programmers have encouraged whenever possible.

Qwerty is almost certainly set to be the best selling 8-bit game of the year, and both what I've seen no gamer's collection will be complete without it.

It combines a basic arcade shoot-'em-up with the strategic importance of obtaining and using the various level powers and spells you'll find as you explore. Once you start playing, you won't be able to put it down.

Right then, Mark, where's that email got to?



The Atari development team working on *Qwerty*. Bob Allen and Kevin Palmer (background) and Tony Porter.

We looked last month into the details of the CIO command system, and armed with that information, the question I left you with should have been a double:

If you remember, I asked you why it wasn't feasible to use the SID command to perform the Memory Put and Memory Get operations from Basic.

There are actually two reasons (both related to the peripherals which SID passes to the operating system). The command number is obviously no problem, but in addition SID passes three other pieces of information to CIO—the values of ICAN1 and ICAN2 (the first two auxiliary bytes) and the address of a string containing the target information.

Unfortunately the Memory Put and Get commands need to be supplied with a buffer address (not a target address)—though in a patch that would be overcome by using a long string.

However, SID has no facility at all to send the target bytes ICALLH without which the binary transfer operations can't function. In fact, SID actually corrupts any existing values, which means you can't FORCE them in beforehand.

Now that we've covered the operation of CIO from the end user's point of view, let's take a look at how the operating system handles the command block we've provided. Perhaps the easiest way to do this would be to follow the OS through the CIOV vector at \$B460 and see what happens next.

Finally, all the operating system has to work with is the value in the X register, which tells it which ICIB to use. We've represented the table of ICIB addresses as Figure 1, and let's assume in the example that we are using ICIB one, at address \$B560.

The X register will therefore contain the value \$10 (16 in decimal), which is

Delving into data transfer

Part 4 of André Willey's series on the Atari's input/output facilities

the offset from the start of the ICIB table—16 in hex (\$10 decimal \$B560).

Using the X register as an offset, the OS now scans all of the relevant information into a special vector, one at a time. Known as the Zero page Input/Output Control Block, or ZICB, it sits at \$D137 (decimal 1) and needs to contain the same information as ICIB one did (ICCBM becomes ICCBM7, ICANI becomes ICANI7, and so on).

The next thing the OS must decide is just what type of device you want to access—cassette disc, printer, screen or whatever. It finds this information

by checking the buffer address, which is then points to your target string containing the device identifier (C, D, P, S, and so forth).

Once it has this device specifier (the argument is a byte, let's say it was 'P'), it must decide which piece of code is appropriate to handle the data, and where in memory it may be found.

You may remember Figure 8 from the first part of this series, in which we described the various types of device that the OS could access, and it is to this Header Address Table that the OS goes next.

In fact, it starts looking for the name 'P' at the end of \$B61000 rather than the beginning. This rather weird fact means that adding a new handler to take over from an existing one is very easy—you simply tack it on to the end of the list and the OS search will find and use your new entry before it reaches its own original version.

Once the device name has been found, the OS knows that the next two bytes will contain an address for the

ICIB Zero	\$B460	(\$B3)
ICIB One	\$B560	(\$4B)
ICIB Two	\$B660	(\$64)
ICIB Three	\$B760	(\$83)
ICIB Four	\$B860	(\$A2)
ICIB Five	\$B960	(\$C1)
ICIB Six	\$BA60	(\$E0)
ICIB Seven	\$BB60	(\$F9)

Figure 1: ICIB Start Addresses

HATAB + 0	P	\$B400	(\$B18)
HATAB + 3	C	\$B440	(\$B33)
HATAB + 6	E	\$B480	(\$B58)
HATAB + 9	S	\$B4C0	(\$B84)
HATAB + 12	K	\$B400	(\$B400)
HATAB + 15	D	\$B4C0	(\$B80)
HATAB + 18	R	\$B280	(\$B10)
HATAB + 21	—	\$0000	
HATAB + 24	—	\$0000	
HATAB + 27	—	\$0000	
HATAB + 30	—	\$0000	
HATAB + 33	—	\$0000	

NOT: Assumes One 2.8 and 800 KB 525K Handler present. Unused entries are filled with zeros.

Figure 2: The Header Address Table at \$B400 (\$B4)

handlers associated with it, as shown in Figure 11. In the case of our P- system, do this would be \$E400 (\$B416) — 8 bits inside the machine's ram.

So there we at last found the address of the machine code which will transfer our data to the printer? Well, not quite. What we actually find when we look at \$E400 is yet another table.

This one, the Handler Vector Table, contains the two-byte addresses of the machine code routines to be used for each possible command we might have required. These are similar to the commands we talked about last time and consist of Open Close, Get Serial Put Serial, Get Status and Special.

The addresses given in the table are in fact one byte lower than the actual beginning of the machine code routines, so if you want to call any of them for yourself, don't forget to add one to the location given.

The reason for this is rather complex and involves the 6802 JSR and RTS operations, so unless you want to delve further, it's probably best to take it all from now.

There are five of these vector tables in all — one each for the editor, screen, keyboard, printer and cassette — and each is 16 bytes long. The first is located at \$E400 (\$B408) and then every sixteen bytes thereafter. The first 12 bytes in each table contain the 16 vectors mentioned, leaving us with four bytes per table to be unused.

The last three of these contain a machine code jump instruction to the information code for the device, and the last byte is unused.

The first two commands (Open Close, Get Put and Special) are obvious, but the Special vector needs some explanation. This points to the machine code which handles all of the hardware specific functions of a given device not covered by the normal I/O commands — but only all those operations with an ICCOM number greater than 15.

These include the disc commands such as Remains, Erase, Protect, Unprotect and so on, the \$B400 commands, the screen drawing commands and any others which apply to a specific device only.

In some cases — such as our printer example — no extra functions are available so this command will do nothing but return in error (40) to the P- register — Function not Implemented.

Don't forget that when Atari modified the operating system for the XL750 range it moved a lot of the machine code around in memory

Device	Open	Close	Get	Put	Status	Special	JMP to
\$E400	E	F0F8	F0D0	F0E0	F0A3	F0C5	F0E4
\$E410	S	F0F5	F0D0	F0E0	F0A8	F0C5	F0F6
\$E420	K	F0D0	F0D0	F0E1	F0B0	F0C5	F0E4
\$E430	P	E08E	E0D6	E0E0	E0A8	E0B5	E0B0
\$E440	C	F0F8	F0F4	F0F6	F0D7	F0A4	E0A1

Figure 11. The new Atari Handler Vector Tables (2048K 68020 CPU)

Thus, while the room-based Handler Tables will always be found at the same locations in any Atari, the contents of those tables will be completely different for an XL or XT when compared to those of a 400 or 800.

Figures 11 and 12 show the values in both cases, but should Atari do another major rewrite of the OS for a future machine, these could all change again.

You will notice that neither Figure 11 nor 12 contain any vectors for the disc or \$B232 handlers. These are both special cases which load themselves into memory from the unit in question.

On disc the handler is the Dos system which you place on your hard disc. It obviously fits no room-based vector table, and all must contain its own.

When Ops loads it places an entry in the Handler Address Table (\$B408) which points to a similar block of vectors within its own code in ram. Since there is no rule that a vector table must be in ram we'll be using the same technique next time to add our own device driver.

Now the OS has at last found the actual address of the routine it requires. It does a JSR to the relevant piece of code and the handler itself takes over, looking up the information it needs from the corresponding I/OCR.

We won't be going any deeper into the I/O system at this point because here the Serial Input/Output system

(SI/O) takes over in order to pass our data to the peripheral in question.

Once the data transfer is complete the handler updates the information in the I/OCR, such as modifying the length count to the actual number of bytes transferred and updating the status variable.

All it then needs to do is place the error code back in the Y register and return control to DOS.

DOS now does a little housekeeping of its own. It places the original value back in the X register and moves the modified contents of the I/OCR back into the calling I/OCR — in our example that would be I/OCR one.

Finally, before returning to the calling program, it checks the Y register, and if its value is larger (negative than 1) (1 being the code for no error) it sets the interrupt flag in the I/OCR to indicate that the user should look into the error condition.

So now you know what the operating system goes up to when you do a simple JSR I/OCR. The whole operation takes time, of course, but is very flexible indeed!

You can see the time delay for yourself by sending 1008 bytes of data to a disc or tape using multiple PUT statements, and then by using the Heavy Put Program from last month.

■ How about the difference in execution times and use if you can explain it — I'll let you know the answers next month, when we'll begin to put together our own device driver program.

Device	Open	Close	Get	Put	Status	Special	JMP to
\$E400	E	F0F0	F0D0	F0A8	F0A7	F0D0	F0B0
\$E410	S	F0F0	F0D0	F0F7	F0A3	F0D0	F0A6
\$E420	K	F0D0	F0D0	F0F0	F0B0	F0D0	F0A6
\$E430	P	F0C1	F0F6	F0E8	F0CA	F0A6	F0C5
\$E440	C	F0C5	F0C5	F0D9	F0A3	F0A4	F0D6

Figure 12. The room-based Handler Vector Tables (2048K 68020 CPU)

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

NEWSLETTER

Software hotline fills the gap

A REVOLUTIONARY support package for business and communications software users which includes membership of MicroLink has been launched by software consultancy and software design firm Interlink.

It will provide previously unavailable support for the latest product - especially under £100 - software packages.

In addition, MicroLink will provide interim users with the basics of office tools, mail, data and other communications facilities and databases.

Interlink managing director Mike Lane said: "As the trend toward low cost hardware and software has gathered momentum, the traditional dealer has not been matched up to the market."

Consequently the bulk of new business users have been left totally unsupported because the high prices and volume sellers supplying them are not geared up for the task. Interlink will fill the vacuum by supplying support at a price the new generation of users can afford.

Initially this will be provided through a telephone hotline, but we are pushing ahead with plans for an Interlink bulletin board on MicroLink to extend the service to serious users.

MicroLink on the rates

BRITAIN'S 100-year old Rating and Valuation Association has taken a giant stride into the 20th Century with the help of MicroLink.

Previously, the professional organisation for property experts in local government and private practice depended on phones and letters to communicate. It didn't even have telex.

Now, its 6,000 members - over half female and

helping wife husbands and children - have a home base not only telex, but also a dedicated email and Teletextpage.

The Association was about a foot year when it went to professional status, provides information service publishes the books and holds between 30 and 50 conferences a year.

Association secretary John Pratt said: "Micro-

Link will give us the means to spend up our engineering communications moving documents to and fro between our 1,000 members who are located all over the UK, by submitting our own forms and exchanging information with our offices in the US."

It will also help us organise our conferences, book hotels and speakers and make travel arrangements for delegates.

Japan comes to Salop

SalopLink was the title for the language without progress. Duncan Slater, local member - teaching Japanese to British business people.

The new edition to the curriculum at Lythall English Centre in Shropshire developed from a valuable electronic mail exchange on MicroLink.

with unique teacher Tony Smith.

Smith created a long channelled exchange to study Japanese and suggested that Slater organise a course.

These have been done and after being advertised on MicroLink half the places were filled within a week.

High peak, low tech in Tibet

According to news mountaineer Chris Bonington: "We only a small top compared to climbing Everest and I'm looking forward to coming home and getting to grips with MicroLink."

He was speaking a few days before leaving for Tibet, hoping to add the unsurpassed peak of Mount Everest to his own collection of Himalayan 'conquers'.

When he's not climbing mountains, Bonington can often be found at a computer keyboard, writing one of his numerous

books and articles or simply maintaining the latest news technology.

A self-confessed computer buff, he has joined MicroLink because it will help him organise his expeditions.

"The telex facility will be absolutely invaluable in this respect," he said. "At present I have to rely on the generosity of my accountant and use his office telex machine if I want to send and receive messages, but obviously this isn't always convenient for either of us."

"Transmitting text to

my publishers is a definite possibility. They are a rather out-of-touch firm, but who knows, I may be able to convert them to telex. As a member of MicroLink I'm also looking forward to exploring the many options just for the fun of it."

"Unfortunately I won't be able to use MicroLink to keep in touch with home while I'm in Tibet. Where I'm going is so remote that my messages will have to be carried by runner for three days before they reach the nearest road."

1. *Journal of the American Medical Association*, 1997; 277: 1033-1037.

The flagmaster spent four total in Mack-Holzer's Circle in the Gallery of Enslaving Ken Wilby and many others to come to grief. Some relief is afforded to all those who see the people's Hall in the center.

Lord Masters of Canterbury has got a fair way into The Fens, but needs to know how to get past the dragon for maximum points. To the nearest corner, Marianne Townsend of the ornithologically named Dick Turpin Cottage in Huddersfieldshire, whose solution is given below. (Is any other readers hop at addresses that are particularly appropriate for adventures? Please let's hear from you.)

⑤ Edwards of Crosby Design has written in with the method to get past the impediment at Waverley. This problem has been troubling several readers, among them J.D. Anthony and G. Bell at Gannon. What you have in the case is a transition in the roof and

PHYSICS AT THE

Figure 1

Please provide a pass?
 AND HOLD UP THE FOLLOWING
 THE AREA OF THE RIGHT CORNER
 ABOUT THE 1990 LEXUS

1. *Journal of the American Medical Association*, 1997; 278: 1019-1024.

Mark in the past
Terry & Ted School 1988-1990

Journal of Management Inquiry

What you get is light rain!
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1. *Journal of Management Studies*, 1997, 34, 1, 1-14.

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The distant adventures arising you might be interested in a simple suggestion I've taken some called Adventure Probe possibly published and aimed solely at adventure players.

This recently published feature reviews tips, articles, maps and guides other adventure related material. By the looks of the issue sent to me *Adventure Probe* is well worth buying. If you're interested in getting a copy or taking out a subscription, you can contact the editor Sandra Shiley at 38 Maroon Road, Highland, Illinois 60035.

Following the Christmas deadline of my favourite top twenty album issue, Alan Parker of *Beatspace* mentioned who Infocore's Christmas lists included. He says that although it is one of Infocore's earlier games, he still finds it a well-designed single navigation which has paved the way for greater interaction with other magazines in the advent of

Il vero grande ostacolo della democrazia politica italiana è nel

think that I must have left it out by oversight. Of all the adolescent adventures, *Lead*, *Deadline* and *Escape* are the best, and the interaction of the player with the characters is superbly done. Trouble is what adventure can I drop out if I am to substitute *Deadline*? An endorsement of *Escape* sets the conditions.

While we're on the subject, why not write in with your own top ten adventures lists? I'd be fascinated to find out what other people enjoy playing and why, and might publish some of the best on Future magazine.

On the subject of your letters my mailing grows ever larger each month and although I can't guarantee a personal reply to everyone, your chances of getting one are much improved if you can enclose a stamped self-addressed envelope with your query.

Being cast in base metal with gold leaf unfortunately my local Post Office consistently refused to take 100 for gold (except?)

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These readers would like your names to be added to the mailing list.

Alan J. Palmer, 37, Paadenboro Road, Strongsville, Hants W22, T.A. Adventureland, Pease Adventure, Monon Rapids, Woodco Gorge, The Coast, Strongsville, Mystery Parkhouse, Pyramid Of Doom, Ghost Town, Savage Island 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828,

Andrew Leach, BSc Honours
Squire, Leeds LS2 1AD, Leeds City
Darkness Lodge, Sisson Downs
Ings, Wharfedale, Leeds 3

Mr C. Loughton, 26 Birmingham Crescent, Silverdale, Nottingham NG5 3EY. The Power Of Magic, Red Moon, Lords Of Time, Dungeon Adventures.

GO WITH THE FLOW

Martin Walsh of *Spain* has found two real players in *The Power*. He has found that it is possible to treat the paper well with the discernable bias in the captioned. He has also discerned that although you can't normally take the postcard, you can if you put something on it. Good work, Martin!

Mr. J. Phares of Berkeley has the answers to pressing American questions which, if correct, is

adventures. Starting with the September issue, if you log in the e-mailed SAT online, at the input prompt the word test will be displayed on the screen page by page.

If you have a printer, you can direct the output to it instead by using the command `SAY LOGF`, or `SAY LOGF APPN` to change to each program's output member.

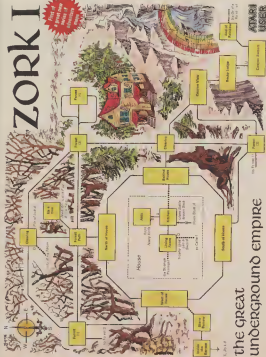
These goals are supported by strong evidence from numerous well-controlled studies and

grains, and it is likely that the Open Sesame style code was left in by the developers to assist with speedy debugging of returned faults or errors (30).

Obviously as one playing the game will ever expected to find such odd words as now if you really stuck on an indicator often you can virtually find the complete solution. What a bonus for solving those really tricky puzzles like the *Number One*.

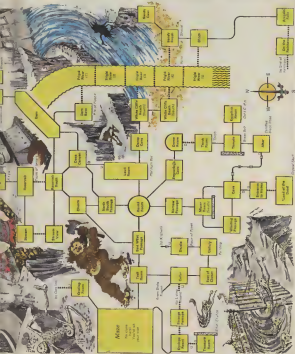
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Build your own Epson interface

Epson printers have always been recommended by Atari as an alternative to their own own low cost and relatively limited machines. But they together with Epson compatible types produced by other manufacturers all suffer from one big disadvantage — you can't plug them into the Atari's serial port with your other peripherals.

If you want to drive this kind of printer you will need some form of interface which can convert all data to joystick form.

You could pay out £80 for an Atari 850 interface module (plus a further £30 for the printer cable) or around £50 for a third party hardware interface such as the Graphics

Adventurer. This software driven gadget can be built for under £12 complete.

It will handle all printer commands (PRINT, LIST, P) and also act just like a hardware interface, but it needs no separate power supply and very little can go wrong with it.

The device program is written entirely

in machine code, loads and runs automatically on power up and it is System Reset proof so you can forget all about it once it's loaded into ram.

Unless some catastrophic testable joystick printer interface, this one leaves you £ free and it will work with any language cartridge including AtariWriter.

Let's look at the hardware first. You will need two joystick cartridge sockets and a 38 way Centronics type plug with solder terminals — not the

insulation displacement (IDC) type. Test the cables first using a standard patch; then cut them to a length of 15 inches or less and discard the socket ends.

Table 1 shows how everything should be connected together to suit Epson and other compatible printers. Remember to link Centronics pin 9 to pin 30 inside the plug.

Building this type of connector can be a bit fiddly and it is a good test of soldering skill. If you don't fancy doing it yourself you can buy a ready built and tested cable assembly from Bill Design for not much more than its component parts would cost.

The software is less than 15k bytes long but is quite complicated to understand so unless you're happy with machine code you can ignore programs 1A and 1B and skip straight to our discussion of the Atari listings.

Get ready to 'C' the interface works by inserting a new printer handle which intercepts the normal OS routine and directs all output to the joystick ports where it appears in per cent form.

Adding a new handle is fairly straightforward and is being covered in more detail in Andre Willey's series on using CIO — See page 54.

When the computer is instructed to print a block of data to the printer, CIO sends out one byte at a time via the 6800 Accumulator. Thus at the start of the PUTBYTE routine, register A will contain the next character to be printed, as provided by CIO.

PUTBYTE first checks that the printer is ready to receive data by looking at the busy line (STRBUS). If a high (5 volts) it means the printer is working on some other task so the routine pauses until STRBUS goes low again.

Then it checks to see whether the character in register A is an Atari and if so flag transmit it into the normal Aschi Carriage Return (code 13). This code instructs the printer to start printing the character in its buffer and also produces a line

	Joystick pin	Joystick function	Centronics pin	Printer function
JOYSTICK IN	1	BIT 0	2	DATA 1
	2	BIT 1	3	DATA 2
	3	BIT 2	4	DATA 3
	4	BIT 3	5	DATA 4
	5	POT 0	—	—
	6	STRNG0	11	BUSY
	7	+5V *	—	—
	8	OV	16	GROUND
	9	POT A	—	—
JOYSTICK OUT	1	BIT 4	6	DATA 5
	2	BIT 5	7	DATA 6
	3	BIT 6	8	DATA 7
	4	BIT 7	9	STRNG1
	5	POT B	—	—
	6	STRNG1	30	FAULT
	7	+5V *	—	—
	8	OV	33	GROUND
	9	POT A	—	—
CABLE	—	—	9 **	DATA 8
	—	—	30	GROUND

Table 1. Connecting the joystick leads to the printer's Centronics plug.

* Not used unless battery board fitted.

** Connect permanently to ground at pin 30.

00	JSRINSTR 14	JSRINSTR INSTRUMENT - READ INSTRUMENT
01	00 0000	
02	00 0000 0000	
03	00 00 0000	
04	00 00000000	
05	00 00000000	
06	00000000	
07	00000000	
08	00000000	
09	00000000	
0A	00000000	
0B	00000000	
0C	00000000	
0D	00000000	
0E	00000000	
0F	00000000	
10	00000000	
11	00000000	
12	00000000	
13	00000000	
14	00000000	
15	00000000	
16	00000000	
17	00000000	
18	00000000	
19	00000000	
1A	00000000	
1B	00000000	
1C	00000000	
1D	00000000	
1E	00000000	
1F	00000000	
20	00000000	
21	00000000	
22	00000000	
23	00000000	
24	00000000	
25	00000000	
26	00000000	
27	00000000	
28	00000000	
29	00000000	
2A	00000000	
2B	00000000	
2C	00000000	
2D	00000000	
2E	00000000	
2F	00000000	
30	00000000	
31	00000000	
32	00000000	
33	00000000	
34	00000000	
35	00000000	
36	00000000	
37	00000000	
38	00000000	
39	00000000	
3A	00000000	
3B	00000000	
3C	00000000	
3D	00000000	
3E	00000000	
3F	00000000	
40	00000000	
41	00000000	
42	00000000	
43	00000000	
44	00000000	
45	00000000	
46	00000000	
47	00000000	
48	00000000	
49	00000000	
4A	00000000	
4B	00000000	
4C	00000000	
4D	00000000	
4E	00000000	
4F	00000000	
50	00000000	
51	00000000	
52	00000000	
53	00000000	
54	00000000	
55	00000000	
56	00000000	
57	00000000	
58	00000000	
59	00000000	
5A	00000000	
5B	00000000	
5C	00000000	
5D	00000000	
5E	00000000	
5F	00000000	
60	00000000	
61	00000000	
62	00000000	
63	00000000	
64	00000000	
65	00000000	
66	00000000	
67	00000000	
68	00000000	
69	00000000	
6A	00000000	
6B	00000000	
6C	00000000	
6D	00000000	
6E	00000000	
6F	00000000	
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96	00000000	
97	00000000	
98	00000000	
99	00000000	
9A	00000000	
9B	00000000	
9C	00000000	
9D	00000000	
9E	00000000	
9F	00000000	
AA	00000000	
AB	00000000	
AC	00000000	
AD	00000000	
AE	00000000	
AF	00000000	
B0	00000000	
B1	00000000	
B2	00000000	
B3	00000000	
B4	00000000	
B5	00000000	
B6	00000000	
B7	00000000	
B8	00000000	
B9	00000000	
BA	00000000	
BB	00000000	
BC	00000000	
BD	00000000	
BE	00000000	
BF	00000000	
C0	00000000	
C1	00000000	
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C8	00000000	
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CA	00000000	
CB	00000000	
CC	00000000	
CD	00000000	
CE	00000000	
CF	00000000	
D0	00000000	
D1	00000000	
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EE	00000000	
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F8	00000000	
F9	00000000	
FA	00000000	
FB	00000000	
FC	00000000	
FD	00000000	
FE	00000000	
FF	00000000	

Program 14: Prime instruction data storage

find, provided you have selected a suitable hardware fast data address GSP interface.

Sending the character to the joystick ports is easy — we just store it at PORTA (000000) whereupon bits 0 to 3 appear at port one, and bits 4 to 7 at port two as shown in Table 1.

The printer won't actually do anything with the data until its strobe line goes low, and here we have a problem. Only eight output lines are available from the two joystick ports, and we need them all to carry an eight-bit character. So what can we connect

the strobe line to?

The answer is that we cheat, by taking the eighth bit (bit 7) from the character, and connecting it to the Strobe line. Some normal characters use only bits 0 to 8 (ASCII codes 0 to 127), this doesn't matter for most purposes.

By making bit 7 on or off we can now send the strobe line high or low at will, without affecting the character data. The printer expects to receive eight-bit characters, so we can't just ignore its Data 8 line. Instead we connect it permanently to ground via Cnt

turnout pin 30. The printer therefore sees an eight-bit character whose eighth bit is always low.

Back to the source listing: P01 first makes sure that bit 7 is high, then sends all eight bits to the joystick ports. J08 DELAY wastes about six microseconds, which gives the data lines plenty of time to stabilize, then bit 7 is switched off, sending the strobe line low, and the printer responds by loading the character into its buffer.

[illegible]

After a further six blindfold trials, the number-one and two fighters were still the routine beats by CBO, leaving the T region in the void with a successful date.

This process continues until all the data has been printed then EO calls the CLOSE routine and hands control back to Basic or whatever other language cartridge is installed.

Program 18 shows the alternative *unwind* code for the common version. It's different from the *dis* code because we will be using *unwind* format to load the *interface* program. That ensures that it is possible to the user loads rapidly. *dis* need to occupy page 1 but not want to show memory size and can be used in any language package. Also it looks more professional than *dis*.

In both versions, the code sheet of NEWTAB contains a initialization routine which make sure the program loads correctly into a safe area of ram, and a System Reset code.

The cassette version uses a standard subtitle format so the subtitles are contained in a header and the Aegis does label handling protects the code just as *System Board*.

More information on webcasting is provided in the article on broadcasting these programs on page 12.

The disk version loads into an AUTORUN EXE file, which is a lot friendlier and easier to handle than a disk notebook. With this system the header is different, and extra code is added to protect the software program against System Restore.

Also the disk version needs to load a run address during the load process and this appears as a loader after RMSE. The code from MINTAB to RMSE is identical on both sides.

The cassette version costs the same at \$7.99 (17.99 elsewhere) but the download has to be downloaded by December 31. A free college license, so it starts at \$1,000 (plus download).

If you have an assembler you can put the program together you like in turn and when assembled the code is not so horrible.

That's the end of all our machine code interfaces. Basic programmers can return to now. Programs I and II are completely self-contained. They need to be BLISS just once to create the appropriate workload file, and can then be discarded.

Bear in mind that machine code has to be typed in absolutely correctly or it will probably lock up the computer. Always be sure to SAVE a temporary copy before you try to RUN it.

For the disk version, insert a disk which doesn't already contain an AUTOEXEC.BAT file then type RUN and hit Return. The file will be created in a few seconds and it will load and run automatically whenever you switch on with that disk inserted.

To make the cassette version, insert a blank cassette which has been fully rewound, then type **SAVE** and hit

[illegible]

1001 0000 10,140, 10,1,14,14,17,19,10,11
 1011 11,17,19,10,14,14,17,19,10,11,11
 1101 0000 10,100,100,100,100,100,100,
 1101,100,100,100,100,11,11,11,100,100,100,
 11
 1001 0010 1,111,102,10,111,100,100,10,1,1
 1011 1000,100,10,10,111,100,10,100,10
 1101 0010 100,100,111,100,110,100,10,100,
 11,10,100,101,10,111,10,102,10,10,102,10,
 11
 1001 0010 1,111,101,10,111,100,10,111,100,
 1,10,11,100,100,100,10,10,10,10,10,
 1101 0000 the last one looked like a three
 digit number that was written using the
 code 1101



LINE	QTY	LINE	QTY	LINE	QTY
1	100	2	50	3	25
4	100	5	50	6	25
7	100	8	50	9	25
10	100	11	50	12	25
13	100	14	50	15	25
16	100	17	50	18	25
19	100	20	50	21	25
22	100	23	50	24	25
25	100	26	50	27	25
28	100	29	50	30	25
31	100	32	50	33	25
34	100	35	50	36	25
37	100	38	50	39	25
40	100	41	50	42	25
43	100	44	50	45	25
46	100	47	50	48	25
49	100	50	50	51	25
52	100	53	50	54	25
55	100	56	50	57	25
58	100	59	50	60	25
61	100	62	50	63	25
64	100	65	50	66	25
67	100	68	50	69	25
70	100	71	50	72	25
73	100	74	50	75	25
76	100	77	50	78	25
79	100	80	50	81	25
82	100	83	50	84	25
85	100	86	50	87	25
88	100	89	50	90	25
91	100	92	50	93	25
94	100	95	50	96	25
97	100	98	50	99	25
100	100	101	50	102	25
103	100	104	50	105	25
106	100	107	50	108	25
109	100	110	50	111	25
112	100	113	50	114	25
115	100	116	50	117	25
118	100	119	50	120	25
121	100	122	50	123	25
124	100	125	50	126	25
127	100	128	50	129	25
130	100	131	50	132	25
133	100	134	50	135	25
136	100	137	50	138	25
139	100	140	50	141	25
142	100	143	50	144	25
145	100	146	50	147	25
148	100	149	50	150	25
151	100	152	50	153	25
154	100	155	50	156	25
157	100	158	50	159	25
160	100	161	50	162	25
163	100	164	50	165	25
166	100	167	50	168	25
169	100	170	50	171	25
172	100	173	50	174	25
175	100	176	50	177	25
178	100	179	50	180	25
181	100	182	50	183	25
184	100	185	50	186	25
187	100	188	50	189	25
190	100	191	50	192	25
193	100	194	50	195	25
196	100	197	50	198	25
199	100	200	50	201	25
202	100	203	50	204	25
205	100	206	50	207	25
208	100	209	50	210	25
2					

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E. J. O'NEILL, 80 Highland Avenue, Boston, Massachusetts 02118

Skate Crazy

By MARK RILEY

CAN you survive all the levels of our fast and furious arcade game Skate Crazy? You control a small man on a skate board who must maneuver his way along a wall while being attacked by various flying objects.

The ice walls are festooned with combinations of solid and moving blocks and moving conveyor belts, which cleverly trick your man away from the right hand end of the wall.

If you are skilled enough, the man can make use of the sky hook which moves across the top of the screen on the higher levels. It can carry him over blocks and other hazards which would otherwise be impossible.

Can you get a bonus by making it through all six levels? Can you beat the hidden chest mode which will allow you to skip the most difficult levels?

Find out by trying in Listing 1. Save the program on to disc or cassette and then test it with our Get it Right! check-out program.

Alternatively, you can download Skate Crazy from Macintosh Happy skate boarding!



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HAVE you ever wanted to create Glie Worlds script to add characters to your adventures? Or design graphics characters for games (the popular wargame Eastern Front uses a map made up entirely from redefined characters)?

Now you can both quickly and easily with my Advanced Character Editor (ACE) program—a composition tool for redefining all or part of the Atari character set.

ACE is in three parts. Part 1, the main program, selects or loads the glyphs and will run as a stand-alone program, or as a set of basic options for editing characters.

Parts 2 and 3 will be published over the next two months. These sections are in the form of subroutines to be added to the main program. The full three-part program uses most of the Atari video ram, so will only operate on machines with a minimum of 48k.

If you are taking in the looking it is essential to use the most low-level text as they appear in the listing, as well as entering all PEEK statements lines, otherwise you may experience problems when adding the next two sections.

When you have typed in the program, save it to tape with the command LIST C, or to disc with LIST D (ACE). Do not use the SAVE command as this will prevent the merging of the other sections with the main program.

Load ACE to tape or disc before running it. The Character Editor program POKEs around a lot in the Atari Operating System—a mistyped POKE could crash the whole machine and ruin all your hard typing work.

Part 2 will add a data command that lists the built-in characters that represent characters, as well as the facility to save and load character set data to tape, disc or printer for later inclusion in your own programs.

Part 3 is a graphics designer and animator module used to design large shapes made up of more than one redefined character. The animation section is used to create cartoon movies (and animation sequences).

The Character Editor screen display is split into four sections called Menu Character Set, Graphics and Pad.

The top of the screen displays the names of valid commands. The Data, Save, Load, Animate, Colour, and Pad commands are listed in ACE Part 1, but are only used in Parts 2 and 3 of the program. If you try to access any of these commands you will not crash the program but have a buzzer sound which is sent by ACE to indicate that

The ACE way to design your own characters

START
OF A NEW
SERIES

STEPHEN WILLIAMSON
shows how to create
your own custom-built
character set

an error of less has been caused.

Comments are accessed by pressing a single key, as indicated by the mouse character at the beginning of each option.

The option currently being executed is highlighted in mouse letters on the menu.

All prompts, information or addressed commands associated with each option appear at the right-hand side of the menu screen.

To exit an option press the Esc key. There are one or two exceptions to this rule, but they only occur in the Painted Animation sections.

The next part of the screen display shows the character set. When the program is first run the character set is the standard Atari set which includes letters, numbers, punctuation, graphic symbols and other symbols such as @ and +. This display does not include mouse characters.

The one exception to the standard Atari set is the symbol " which has been redefined by the program as a rectangle that acts as a cursor during the Pad module. In Part 2 of this series I discuss how it is not recommended that you edit this symbol.

ACE supports three text modes—Graphics 0, 1 and 2. The display shows the current character in all three modes. Graphics 0 is the normal text mode on powerup with 48 characters to the line. Graphics 1 and 2 each use larger but on 28 character lines.

Graphics 1 and 2 normally support only 84 characters and exclude the lowercase and graphic symbols.

Because of this, if you choose to edit a symbol excluded from Graphics 1 or 2 then that part of the display will be blank.

Graphics 0 is a one colour mode, while Graphics 1 and 2 are five colour modes (four character colours, and the background). The Graphics 1 and 2 characters are therefore displayed in four colours. A subsequence will be added next month to alter these colours.

The bottom section of the screen display is used in conjunction with the Pad and Animation options in Part 3, to create multi-character designs and animated sequences.

EDITING COMMANDS

The Edit command is the default mode, and when exiting from other options the program will return to Edit mode.

The current character is displayed on the right-hand side of the Menu screen, with the CHR\$ code shown in the Address character code. When the program is first run the current character is A, with an Address code of 66. If you use the statement

```
PRINT CHR$(66)
```

then the letter A will be displayed on the screen. The Address code is a slight variation on the normal CHR\$ codes used by most computers and communications technology.

The SC Code shown in the screen

code that is displayed with the POKE and PEEK commands. If you POKE this system program into the appropriate character set, the appropriate character will appear. For example, switch on your Atari and type in direct mode:

POKE 40000,33

The letter A will appear on the screen. Since address 40000 is the location within the system ram of a disk machine.

There is actually another set of codes — the key function codes — which are used solely by the keyboard handler routines, and are thus not listed here.

The edit grid in the center of the Menu display is an enlarged version of the current character. A cursor is moved around the grid by the joystick. To add a character, press the fire button to plot at input single post blocks on the grid.

Any changes made on the edit grid are reflected in the current character. The standard Atari display for the current character remains fixed on the

video display but the character is displayed in the character set the graphics and if appropriate the Pedit display will be altered.

To change the current character press key B and when prompted, enter another character by pressing the chosen key. All characters except inverse ones will be accepted, though lowercase and control key graphic characters will not be displayed in Graphics 1 or 2.

F. FEATCH

Featch changes the current character shape to that of another character. For example, if the current character is B then choosing character C when prompted during the Featch option makes the shape of character B a duplicate of character C, but leaves character C intact.

I. INVERT

This option inverts the current character.

M. MIRROR

This does a mirror image of the current character.

R. RESTORE

Restores the current character to the original Atari character set design.

W. Wipe

Clears the edit grid and erases the current character design.

Character keys: MOVES

Simply use the cursor keys — without pressing Control or Shift — to move the current character shape one pixel up, down, left or right.

Now you know how to use the basic editor functions you can type in the program and start using it.

■ Next month we'll be giving you more routines to allow you to load and save your own character sets, and also to create DATA sets for inclusion within your own Basic programs. Don't forget to enter your code if the key above now to avoid disappointment.

Full listing starts on Page 48

ATARI OWNERS

WHAT ARE YOU MISSING?

AT PAGE 6 Magazine we recently had a readers survey. Here's what some of our existing readers said.

Do you subscribe to other magazines?

"The one on Great Britain."

"Pages 1 has not starting but I have not read it yet."

"I've got magazines in my hand on it."

"I've got magazines that I have to read in waiting."

"Yes."

"I've got magazines that I have to read in waiting."

"I've got magazines that I have to read in waiting."

"I've got magazines that I have to read in waiting."

"I've got magazines that I have to read in waiting."

"I've got magazines that I have to read in waiting."

"I've got magazines that I have to read in waiting."

When opening the magazine?

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"The way it comes out is very good but it's not good."

"Pages 1 is very good but it's not good."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

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"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

"I'd like to see the magazine first and then the grid."

DO YOU REALLY WANT TO MISS PAGE 4?

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– Anthony Gann, writing about the Atari ST version in the May 1986 issue of the Atari User

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TO ORDER TURN TO THE FORM ON PAGE 61

So you want to write for...

ATARI USER

WANT to see your name in print? If you would like to write for us, here are a few hints and tips which will give you a better chance of being accepted.

● **Whenever you send us** should be of general interest to other Atari users. You may find a program to tell you when your robot needs feeding, all well, but it's doubtful that *Robot* will be a cross-market hit with a group of software.

● **When submitting anything** always send both your own and another program on tape or disc, rather than just on paper. If you have a printer, a better output would be preferable to a typed one. We can't accept handwritten programs, no matter how good they might be.

● **Don't forget that the same applies to articles.** Please send a copy of the final on tape or disc, as well as a printed copy of the article, clearly from Atari records.

● **Avoid using non-standard tape or disc formats** such as Dos 3. Spectral or non-standard head sets (tapes). If there is absolutely no way you can send a disc, or tape of your text, you should type it clearly, double spaced, on white paper. If your work already got on being good enough we could then get it transcribed on to computer.

● **When we send a questionnaire** the return of material sent in to us, if you require a stamped self-addressed envelope we will endeavour to do that your work is returned.

● **Make sure that your name and address** and the title of the article or program is on everything you send, including the tape or disc and even sheet of text. A phone number, if preferably domestic as well as evening, would also be useful.

● **Please state clearly that the submission is your own work**, and that it is being offered for publication in *Atari User* and has not been previously submitted elsewhere.

● **We prefer articles to run to between two and four pages** (at about 1,000 words), a single page with diagrams and drawings, or to be broken down into separate parts if they are much longer. Rules are paid per line printed word, not by how much material you actually send, so make your article clear and concise.

● **If you are submitting a program** you should explain how it works, preferably with a rough line-number breakdown. Send out any problems which may occur during typing, and how they can be corrected.

● **Ask to make your programs readable**, with plenty of ROMs to indicate what is going on. However, never omit a ROM statement, as many people like to leave them out when typing in a program.

● **Try your program out on an out-of-the-box Atari.** You will often discover a problem you didn't even consider.

● **Try to avoid graphics and machine code** placed in articles. Unless there is no alternative, put your machine code into data statements, since Commodore graphics are very hard to enter correctly.

● **Always fit, remember that your submission** should be interesting, informative, useful or fun, and clearly laid out.

The address to write to is: **Features Editor, Atari User, Basingstoke House, 44 Clarendon Road, Moulton Grove, Stockport SK7 5NP.**

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STA 710 the contents of the A register are stored at memory location 710.

You could, of course, replace this number 710 with a label, such as COLBAY, for example. Thus, STA COLBAY could mean the same as STA 710.

The STA command can be modified in a number of ways and addressing – which you mention – is just one of them.

This simply means that before the store command is executed the value in the Y register is added to the address you've given.

If Y contained the number 50, for example, then STA COLBAY would mean store the A register at location 760 – or 710 plus 50. In the case you mention, Y is set to a value of zero, and so it can only contain numbers between 0 and 255. It must become 256 when it is decremented by one with the DNY command.

This means that the page of memory is cleared in the order 0, 255, 254, 253 and so on and Y is zero again and the program drops out of the loop at the branch if not equal to zero (BNE) statement.

In this particular case, the address CURPAG is an address in brackets which simply means that the location CURPAG itself contains a further address, which the command will then use.

If we tried it with our COLBAY example then the A register would not be stored in location 710 but rather in an address given at location 710.

If Y contained the address 0000 for example, then that location would have the value of Address 0.

Don't forget that addresses are always stored in two bytes using the 8002's normal 16-bit format, so both CURPAG and CURPAGE will contain part of the address value to use.

Thanks for this last one, please. Now that we have made additional space we'll certainly look into the possibility of naming more at times as saved commands.

ATARI USER Mailbag

We welcome letters from readers – about your experiences using the Atari machine, about tips you would like to pass on to other users, and about what you would like to see in future issues.

The address to send to is:
Mailbag Editor
Atari User
Scripte House
68 Chester Road
Harold Grove
Stockport SK7 5NY

Freezing colour

I HAVE just bought an Atari 800X, and I am not sure how to stop the colours from changing when I leave the machine alone for a while.

I am also looking for a program to stop names and addresses along with phone numbers. Is such a program available on cassette? – **I J Colchester, Aldershot, Hants**

■ The colour change you mention is a feature called *Atari Mode* and can be locked by pressing any key.

The database is more difficult as there aren't any such items as cassette – mainly because the cassette system is too slow to make the idea really feasible.

That said, keep looking through the small ads in *Atari User* and other publications in case some enterprising programmer develops one.

Pictures off screen

I HAVE an Atari 800X, and a 1050 joystick. Please could you tell me how to take games off, or to make screen games.

I have a lot of video pictures of games from the TV but a never working so there is

always a reflection when I use a flash and the too dark if I don't use a flash – **Neil Rickardsson, Camberley, Surrey**

■ You can do screen dumps with a 1050, but most of the programs that enable this (including the one we published in the September 1988 issue) work from 800 and thus are only useful to dump your own screens and pictures.

Your best bet if you want to record your high scores or just take pictures of the game screen is to buy a video screen photograph. These can work very well. Or you can use film and get games (and/or screens) but you must replace a few jungle rules.

Finally, don't use a flash – you want to capture the image on the screen not the part of glass in front of it.

Regularly remove as much outside light as possible. This means closing all the curtains and turning off all the lights.

Get up your camera on a tripod or a steady table top and line up the TV screen in the centre. Try to keep your camera the same height as the TV set and square on to the screen.

If you use a video the game screen you should use an exposure time of between just a second and a second, but if you use film you must try to use a time of 1/1500 or better (400/1/2500 if your camera has that speed).

Adjust the exposure (if using) according to the camera's light meter, or leave it on automatic.

Once you've done all that, focus the camera carefully and use a cable release to avoid any camera shake when you take the picture. You will find that practice quickly makes perfect.

Printer comparison

I WOULD, hopefully, be getting a printer soon. Could you tell me the difference between the 1020 and 1037 printers?

Also I would like to congratulate you on *Atari User*. I haven't missed one issue – **Andrew Fellows, Harrogate, Sussex**

■ The 1020 is a dot matrix printer which means that its characters are made up of bits of tiny dots. The 1037, on the other hand, is a letter quality printer which works more like a typewriter – its characters are printed by an impact head.

The 1037 is great for sending correspondence, but is very slow (about 10 characters a second) while the 1020 is much faster but has a much poorer letter quality. Also the 1020 can print graphics, which the 1037 can't.

Monthly discs

I HAVE noticed that you no longer advertise as *Atari User* a number of programs published in *Atari User*. I do not subscribe to *Atari User*, so I cannot afford a modem at present.

Is there any way that I might obtain the discs? I am tired of typing? – **R Grewell, Watford Hemel Hempstead, Herts**

■ We stopped producing the monthly discs and tapes because there was not enough demand for them.

We might consider bringing them back if enough of you write us and ask for them. What do other readers think?

YOUR HINTS AND TIPS

CAMERA

I THINK I can help James Kelly of Berns, who has problems with the game *Chase* when he can't get able to open the doors.

It's quite easy. After having disposed of the first robber, you must guide the robot down the two parallel passages leading in a long straight line downwards, past the trapdoor in a grey room.

Now you eventually reach a wall at the bottom with a button blocking an entrance in it. Follow the passage very closely until you get to a passageway the two parallel passages.

There, if you have not already done it, you will find a lot of bones. Take the last one out and make your way back to the robot.

Stand against the counter and observe it in the center's place. A laser beam will appear above the passageway and you come to another counter. Observe it and this time pass the button to cut the laser. Take and shoot the

key saving about ten seconds there.

Go back to the other side saving about a dozen seconds the room and you will find a key with which you can enter the room.

When you have finished with the key the second entrance can be made by taking the key to the postbox and putting up the postbox. A man then he takes to one of the four blue rooms.

Robert Lees, Chesham, Bucks

CRYSTAL RIDER

I DISCOVERED a trick while playing *Crystal Rider* if you hold down the control button and press Start, you can go round the arena and play your route without getting stuck by the barriers. — Mark Rodge, Weymouth, Dorset

STARSHAKE

I THOUGHT that your readers might be interested in the following game tip.

The nearest teleport to

the player's core is 500 yards in each direction. If a key shaped object can be found, it will allow the player to move the entire team.

The main card allows the player to enter the game's program and also allows access to part of the game beyond the arc entry door.

Many people seem to be stuck at this point in *Starshake* where the alien's horse appears, but I have finally made it past this screen.

The exact solution is almost impossible to explain, but it involves a lot of doubling back and moving downwards until a horse is lined up correctly with the eye.

After you have quickly to help those stuck in *Starshake*.

John. Allow the player to walk against the arena.

John. After the reader's comments.

Remember: This will give you extra life when the game over message is displayed. **Sparks:** This surrounds the player with an energy field which is lost to the reader.

Flight: Jump to the next level.

Phase: Highlighting the stage door. **Mappe:** Type this then press the space bar to view the map of the entire area. — George Platt, Bolton, Lancs

MERCENARY

I HAVE just been playing *Mercenary* on my ZX81. I went into the elevator cage at 0 05, got the power supply and went through a two-way transmission and arrived in a yellow hallway with two doors.

I went through the Westpasser door, went back to the elevator and took off. I then took the gold to the postbox and got a big reward.

Then I had a look around in the street just outside the city and found an elevator cage with a craft inside. I lost the power supply and went 0 05 in the air.

After 0 05 000 lost on the elevator it wouldn't go any higher. Did I escape from Farg? — Andrew Whitlock, Preston, Lancs

Function keys

FOR some months now I have been reading your excellent magazine and whereas I am finding it very helpful and full of information I have one slight criticism.

The space dedicated to it but seems apparent to be being already used by the by the ST section. I know that this is also a concern of other ST users who subscribe to Atari User.

I am also having problems programming the function

keys on the 70000. According to the *Stor Shop* however this is possible. Can you help? — J. Hayes, Birmingham, Herts

As you can see, Atari ST User has this month become a separate magazine following an overwhining response from both ST and 8 bit users who filled in the survey which we printed in Feb issue.

The help that you enjoy the new Atari User and Atari ST User magazines.

As for the function keys you can check for the Start, Select and Option keys by pressing together: 00270 (00017). You will find a

number between 0 and 7 with 7 meaning 0 between pressed and 0 all buttons.

Bit 0 represents the Start button, bit 1 the Select and bit 2 the Option. Thus the combinations are as follows:

- 0 Start, Select and Option
- 1 Select and Option
- 2 Start and Option
- 3 Option
- 4 Start and Select
- 5 Select
- 6 Start
- 7 None

The Help key on 00, and 00 machines can be used by pressing 00270 (00017). A value of 17 means Help has been pressed, 01 means Shift +

Help and 10 means Control + Help.

As this register holds the last pressed value, you must store it after checking it by using 0000 70000.

Cartridge software

ON the 80000, what is the cartridge slot for? Can it be used for games? — R K. Wood, Manchester

Cartridges have always been an alternative way for developers to provide soft-

were for release. They simply didn't programme in new games unless they are a sure thing.

In fact, on the old Atari 800 there were two cartridge slots but as the extra slot was rarely used the more recent machines have had only one.

Both cartridges have the advantage of loading instantly and being almost indestructible. However they are more expensive to produce.

Most of the early games came on cartridge including *Phoenix*, *Star Raiders*, *Mission Command*, *Darius*, *Kong*—plus such things as *Assaulting*, *Lagis*, *Action* and *Blind* etc.

Recently the cost has proved prohibitive for many games companies, but with the 800X on the horizon we may once again see an upsurge of cartridge based software.

Speedy service

HOPE about this for service? Friday afternoon January 20 I sent for a copy of *8088 Simulator* for my Apple II(500), from Miles Better Software.

Imagine my surprise when above it was that post Monday morning January 21st I expected to wait at least a week longer. *8088 Simulator* is excellent — **Ed King, Christchurch, Dorset**

Compilations please

WHILE browsing through some very old PCMs I found a *Dragon* listing in a 1982 issue by one of your ex-opinion card software

reviewers — **Bob Chappell**. Two are *Asquero*, Mr Chappell, if this was indeed you!

Why not release a compilation tape and also sell all the final programs from the User-help issues?

Finally do you or anyone else know where I can buy copies of *Thrust* and *God II's* Friday and Saturday? — **Mark Cunningham, Nottingham**

■ We all have a history in this industry and Bob's no exception — whether he tries to live it down or not we aren't quite sure. At least he has a good number of years of experience at his fingertips.

What do other readers think of the compilation idea then?

Whatever it will be put on the American label or look around for an old Synapse reprint tape. As for the other title, we're not too

PEN PALS

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24000 **Greece**

Raymond D. Sano, **PO**
N. 8th Street, **Chelmsford**,
Mass 01520 U.S.A.

(See also Raymond's letter elsewhere in this journal)

sure whether it has been released on the Atari. Can any other readers help?

Keep your secrets

HERE is a way of disguising your disc files to prevent unauthorised access.

You first have to modify the DOS SYS file so that you can use control characters in your filenames; then you simply include the *Clear Screen* and the printer control line codes in your file name.

First load your Dos disc with Basic and then use

PAUSE DATA
POKE DATA

You may now save the modified filename typing DOS, then using the format disc and M to make out the new Dos files.

With the new Dos installed load the file you want to protect and type it using the same file name with CHRS(128) and CHR\$(32). These characters may be produced by *Das* Shift+Ctrl and Control+M.

Now type DOS then A and two letters and two hex numbers — assuming it's A if you have a printer then type + F which sends the *Atari* the printer information. Then just watch your printer churn out secret data, but nothing else for your protection.

You can still load the file

PAL is no friend in the USA

I JUST wanted to write and let you know that I think your magazine is excellent.

I have finally in Great Britain got a copy of the magazine and I have been keeping it safe but for nothing to do with Atari I was very excited when I received my last copy of *Atari User* — Volume 1, Issue 8.

After looking at your magazine I agree that I had to see where I was living a copy of every issue, and I have also started to think of referring your publication — and we have also shared copies with other users. In fact, *Atari User* is fast becoming an American favourite.

I have recently visited Great Britain and was a bit disappointed in the availability of Atari software and magazines, although I must admit that things are not much better in New States.

I did notice that there are imported American Atari magazines available — up you ever get an Atari User

from a US label, in the United States?

I have experienced a problem with some British software that I bought and was wondering if you might be able to offer my help or suggestions.

I own an 800 and the programs that I have been having problems with are *Zone II* and *One Man and His Dragon*.

They both look like good games and when I load them the title screens are fine — but when I try to play them the graphics bounce up and down making play impossible.

We have tried them on other Atari but experience the same problem. I have suggested that the problem is within our television system rather than in the games themselves.

Otherwise, we have found British software for the most part to be of excellent quality.

I especially enjoy your software reviews and the amount of space you

provide for readers' letters in the mailing section. Thank you, *Atari User* and please don't ever imagine we discarded it for sure — **Raymond D. Sano, USA**

■ It is nice to hear from our occasional readers — keep on enjoying the magazine.

Your problem with the news is almost certainly to do with the TV system you use. Some American games don't run well here because of the way the news is banded to also be true.

The problem is that in the UK we use a system called PAL which has 50 frames per second with 625 lines per frame.

You use NTSC which has 60 frames per second but with only 485 lines.

Thus although the amount of information displayed per second is roughly the same, any program which relies on the 60 Hz timing signal will work at a different speed in America — and sometimes it won't work at all. If this timing is a critical part of the program,

in the normal way possible as long as you can find the necessary components with the correct character set – so keep a note of the source library.

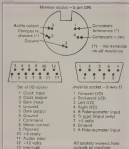
You can't alter the file names DOS SYS, GUP SYS or AUTODRAW SYS as these are special names that the disc system recognises.

It should be possible to modify other versions of Dos, but the ROMs will probably be different. — David Girdling, Harrogate, North Yorkshire

Port pin outputs

PLEASE could you help me by printing the diagrams for the pin outputs on the Atari 800X. Will you? — Neil Richardson, Gwent, Gwent, Gwent

Although we have answered this one before, we still get a lot of people asking about these connections. You should have been keeping up with your back issues because we have covered this issue in the projects section. However, just for you, here are the pin outputs one more time.



Cartridge capers

IN APRIL in L.P. Atari's letter in the March issue of Atari User concerning software compatibility I recently upgraded my 800X (which cost £189 — yes a value who thought it 10 days before Atari classified their product as a 1300X (which cost £300 retail then).

I have had no problems with cartridges or chips, but I have had problems with cartridges. Atari was in OK but I also have General Manager on from Creative Sparks and they will see it in the cartridge port.

I would therefore assume that most of the old Creative Sparks cartridges will be manufactured to the same specifications and therefore will not fit. I don't know if any other third-party cartridge has had this problem or not.

Luckily, after meeting the Creative Atari User Show and discussing this with a representative from Atari's he suggested removing some of the plastic using a knife I did and the cartridge

now fits.

However, I cannot understand why Atari changed the location of the cartridge socket on the 800 machine. It would be much better above the keyboard as in the 1300 model.

Finally what is the best method for cleaning the drive head in a day drive — any special cleaning discs available any good or should I get it serviced by a reputable dealer. — M. Henderson, Woking, Surrey

Tackling your cartridge problem first the ratings of the Creative Sparks cartridge are slightly larger than most certainly and Atari's suggestion is one way around the problem.

However, all Creative Sparks software is now available on budget cassette rather than cartridge so you shouldn't have any further problems.

As you say the port is very convenient on the 800 and we can only assume that this was done to clean up the design of the machine — and to make it a little bit cheaper to produce.

Cleaning drive heads is not the easiest job in the world but the very special cleaning disc would be best. Otherwise, drop it back into a dealer who can do a full service on the drive head.

Computer courses

I WAS reading in the March issue of Atari User about the Harrogate Man At Key Gaming who is teaching a computer correspondence course.

I have a daughter who is eleven years old and I would like her to have lessons in programming her Atari 800X computer. She has had a 16 monthly now and has previously not programmed it at all.

She has tried to type in some of the programs from your magazine but has not had a lot of success. If you could could you please let me know if Gaming's scheme

as I could write to him about a possible course for her?

Also we have Douglas your magazine since January 1989 but we get it delivered from our local newspaper. Does this qualify us as an Atari User subscriber and thus for the special reader offer? — Robert Courtney, Thame, Oxford, Oxfordshire

Key Gaming can be contacted at 1405 Programming, Northampton Road, Harwell, PO8 1AT Tel 8708 481214. He should be able to help you out with your typing problems too.

Unfortunately the special offers are only available with our subscription orders so you don't qualify at the moment.

That said, if you compare the cost of subscribing with the cost of ordering such issues from a newspaper, you will find you have been getting ahead for much more than you needed. Subscriptions orders can also arrive up to a week before many newspapers have them on the shelves.

Running the gauntlet

COULD anyone tell me when Gauntlet is coming out for the 8 bit Atari? — Mark Hodge, Slough, Berkshire

That's simple — by the time you read this Gauntlet should be out. Get our last issue article on the game elsewhere in this issue.

MicroLink

All program listings in Atari User are now available for free downloading on MicroLink, the UK's fastest growing alternative read service. They are hundreds of programs already available on Britain's national on-line database.



A classic adventure — available on the 8 bit Atari for the very first time!

Rick Hanson met with universal acclaim when it was released for the BBC Micro and Electron. Now it's available on disc for your Atari. As Rick Hanson, Special Agent, your mission is to assassinate the evil General Galantaz.

With 230 locations, 70k of text, and a more advanced parser, this top-quality adventure is better than ever!

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Available for	Product	Format	RRP	Special reduced offer	YOUR SAVING	Offer including subscriptions	YOUR SAVING
Atari 520SE	Rob Hanson	Disk	£14.95	£9.95	£5	£14.95	£5
Atari 520SE ²	Mercenary Compendium	Tape	£18.95	£12.95	£6	£17.95	£1
Atari 520SE ²	Mercenary Compendium	Disk	£17.95	£11.95	£6	£16.95	£1.00

TO ORDER TURN TO THE FORM ON PAGE 61

*This is
the game
you'll want
to play . . .
and play . . .
and play . . .*

(And with 3,000+ questions,
it'll keep you happy for months!)





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Only for the Atari 400/800XL, 1300XE



At last — the world's most fashionable board game comes alive on your Atari. And it makes the most of the Atari's sound and graphics to take on an entirely new dimension. Now it can ask you to Name that Tune. Easy? Not when it's played backwards! Order through this special offer and you'll save £2 off the recommended retail price. Take out a subscription at the same time and save £3.

Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari 400/80	Trivial Pursuit 	Cass	£14.99	£12.99	£2.00	£21.99	£3.00
Atari 1300E	Trivial Pursuit 	Disk	£19.95	£17.95	£2.00	£26.95	£3.00

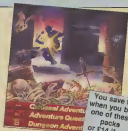
TO ORDER TURN TO THE FORM ON PAGE 61

Two top adventure trilogies for you to play

Award-winning software house Level 9 has extensively re-written some of its best-selling adventures, and released them in two trilogies, *Jewels of Darkness* and *Silicon Dreams*.

In the *Jewels of Darkness* trilogy you start with *Colossal Adventure*, containing all the treasures, creatures, rooms and puzzles of the mainframe original.

In *Adventure Quest* you must discover the Old Roads to the Dark Tower, Fortress of the Demon Lord. Only there can you defeat him. There's magic in the air in *Dungeon Adventure*. Can you discover the treasure while facing the perils of skeletons, carnivorous jellies and orcs?



You save £8 when you buy one of these packs or £14 if you buy both

The first adventure in the *Silicon Dreams* trilogy is *Snowball*. You awake from suspended animation to find your spaceship on a collision course with Eden. In *Return to Eden* you must prevent the defence robots from destroying your ship. You have lost your memory in the *Worm of Paradise*, and you may have to join the governing party to regain it.

Each features:

- Over 600 illustrations
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	<i>Jewels of Darkness</i>	Tape	£14.95	£11.95	£3.00	£35.95	£4.00
	<i>Silicon Dreams</i>	Disk	£14.95	£11.95	£3.00	£35.95	£4.00
	<i>Silicon Dreams</i>	Tape	£14.95	£11.95	£3.00	£35.95	£4.00
	Both	Disk	£29.90	£21.90	£8.00	£71.90	£14.00
	Both	Tape	£29.90	£21.90	£8.00	£71.90	£14.00

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